

ON THE FRONTIERS OF KNOWLEDGE: 30 YEARS OF ALCOHOL RESEARCH

The mission of the National Institute on Alcohol Abuse and Alcoholism (NIAAA) is to support and conduct biomedical and behavioral research on the causes, consequences, treatment, and prevention of alcoholism and alcohol-related problems.

The NIAAA provides national leadership to the alcohol research community and funds approximately 90 percent of all alcohol research conducted in the United States.



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Introduction

The creation in 1970 of the National Institute on Alcohol Abuse and Alcoholism (NIAAA) led to major national interest in research toward solving the problems of alcohol abuse and alcoholism. Although several distinguished scientists had made important contributions to the field prior to that time, funding had been inconsistent and multidisciplinary research on alcoholism was almost nonexistent. With a portfolio that includes internationally respected investigators in a broad range of biomedical and psychosocial disciplines, NIAAA today provides leadership and financial support for approximately 90 percent of all alcohol-related research in the U.S.

An essential impetus to the development of alcoholism research was the acceptance of alcoholism as a medical disorder. This concept has evolved progressively and with considerable controversy over the past 200 years. The disease concept defines alcoholism as an independent disorder characterized by a craving for alcohol—a dependence, or addiction. As such, alcoholism is distinguished from drinking that is merely heavy, problematic, ill advised, or socially unacceptable. True, many alcohol-related problems result from misuse of alcohol by persons who are not alcoholic. Nevertheless, the disease concept has sharpened the focus of alcohol research and has helped remove the stigma from a chronic disorder that is no more inherently immoral than diabetes or heart disease.

In the nearly 30 years since its inception, NIAAA's investment in high-quality biomedical and behavioral research has produced significant results. For example, it is now clear that genes are responsible for approximately half of the risk for alcoholism, making it one of the most heritable of complex disorders. Working from two major lines of evidence, one from the Collaborative Study on the Genetics of Alcoholism (COGA) and the other from intramural studies of a Southwest American Indian tribe, NIAAA-funded scientists have identified several regions—or “hot spots”—on human chromosomes that are likely to contain genes that influence individual susceptibility to alcoholism. Once the genes themselves have been identified, the proteins they encode can be targeted for corrective intervention.

Alcohol affects the brain in many ways. NIAAA-supported investigators have identified the site of transient alcohol-induced changes in the structures of proteins that comprise nerve-cell receptors for neurotransmitters—changes that temporarily modify nerve-cell activity. This research adds to the growing body of evidence that alcohol targets specific protein receptor sites, a finding with significant potential for intervention, both in drug design and eventual clinical application. In the future, this research is expected to provide treatment specialists with even more effective pharmacological tools to help their alcoholic patients recover and avoid relapse.

We also have begun to understand more about the risks to major body organs by excessive alcohol consumption and how to treat alcohol-related medical conditions. For example, discovery of a new research technique that interferes with cellular production of tumor necrosis factor alpha (TNF-alpha) holds promise for reducing liver injury among the more than 2 million Americans with alcoholic liver disease (ALD). Identification of the biological mechanisms of fetal alcohol syndrome (FAS), the country's leading cause of preventable birth defects, suggests potential for pharmacologic interventions and therapeutic measures.

In addition to basic and translational research, NIAAA supports an extensive portfolio of preventive interventions, epidemiology, and treatment research. Genetic predisposition in an individual is not a statement that he or she is destined to become an alcoholic, but a risk factor only. Accordingly, policy, behavioral, and social approaches to prevention remain paramount. Clinical trials of promising new drugs that prevent relapse or inhibit the desire to drink, in combination with behavioral therapy, are ongoing. A growing body of research on treatment has also resulted in improved methods of patient screening and assessment for alcohol disorders. Other examples of rigorous scientific inquiry include prevention studies designed to eliminate drinking in pregnant women, reduce incidence of drunk driving, school- and community-based interventions, and social context and control of drinking in the family and workplace.

Because of the broad implications of adolescent drinking, prevention efforts aimed at this population are a primary focus of the Institute. Recent findings reveal a disturbing correlation between the earlier onset of drinking and the likelihood of life-long alcohol abuse and dependence. More than 40 percent of children who begin drinking before age 15 become alcohol dependent at some time in their lives. Effective prevention in youth may thus be seen as having a payoff in two essential ways. First, it can affect the lives of the persons themselves throughout the most productive periods of their life span. Second, it can be the most effective way to modify risk factors in the children of the next generation by breaking the cycle in the lives of their parents.

Magnitude of the Problem

- More than 100,000 Americans die of alcohol-related causes each year, making alcohol the third leading contributor to mortality related to lifestyle in the U.S. (tobacco is first and diet and activity patterns are second).
- In 1998, the estimated costs of alcohol disorders and their social consequences were \$185 billion. Of this sum, direct treatment and health care costs account for 14 percent; reduced worker productivity for 47 percent; and lost productivity due to premature deaths for 20 percent. Costs associated with alcohol-related traffic crashes—the fifth leading cause of death for Americans of all ages—account for 9 percent, as do costs associated with criminal activity. Almost 39 percent of these costs were spread across the U.S. population in the form of increased burdens on government budgets.
- Nearly 53 percent of the adult population of the U.S. (98 million persons aged 18 or older) have a family history of alcoholism or problem drinking. Approximately 6.6 million children under age 18 live in households with at least one alcoholic parent.
- Almost 14 million U.S. adults meet medical criteria for the diagnosis of alcohol abuse or alcoholism.

- Over 30 percent of high school seniors engage in “binge” or heavy drinking (defined as 5 or more drinks on at least one occasion in the past 2 weeks).
- Fetal alcohol syndrome (FAS), a serious disorder affecting brain function, is the leading preventable birth defect in the U.S., with an incidence estimated between 0.5 to 3.0 cases per 1,000 births. A larger number of individuals who do not express the facial features required for a FAS diagnosis nonetheless experiences alcohol-related neurobehavioral deficits caused by prenatal alcohol exposure.

Accomplishing the Mission: Key NIAAA Functions

To achieve its goals, the NIAAA works in partnership with researchers, healthcare and treatment providers, lay organizations, schools, universities, medical schools, communities, businesses, and State, local, and tribal governments—and through them with students, teachers and professors, families, allied healthcare professionals, administrators, employers, and policymakers.

In order to accomplish its mission, the Institute engages in a number of key functions.

- Provide leadership to address critical issues in alcohol research by working closely with the NIAAA National Advisory Council and convening special conferences, workshops, and expert review panels to determine state of knowledge, gaps in knowledge, and research opportunities.
- Fund the highest quality research grants, contracts, and intramural projects to advance knowledge.
- Promote efficient transfer to the private sector of new technology arising from NIAAA-sponsored research to facilitate the commercial development of new diagnostic tools, drugs and other treatment modalities, and related products with significant public health benefits.
- Collaborate closely with lay, professional, and scientific organizations whose missions and goals complement those of NIAAA in order to identify and coordinate crosscutting functions and programs, including research and public health education initiatives.
- Fund research training and career development and mentorship opportunities for promising candidates at the undergraduate and graduate levels in a variety of disciplines, including social, behavioral, biomedical, and life sciences.
- Aggressively monitor adherence to animal research guidelines, human research subject protections, and ensure nondiscrimination for all participants in NIAAA clinical trials.
- Seek advice from State, local, and tribal communities regarding the practical applications of NIAAA-sponsored research findings.
- Provide support for epidemiology, research, evaluation, and dissemination of information to government decision-makers and the public on the consequences of moderate and excessive alcohol consumption.
- Provide key scientific resources to help further research on alcohol-related problems.